

# GRAPHING

Problem Solving/Data Analysis Unit  
Graphing

Sylvester Middle School  
6<sup>th</sup> Grade

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## 1. CONTENT

### 1.1 Central Focus

Graphing with classmates and everyday life

### 1.2 Rationale

It is essential for students to be able to create, interpret and summarize graphs. Graphs can be found across all subjects and used regularly in everyday life from understanding advertisements, reading the newspaper, creating a budget, portraying information in presentations and making comparisons between oneself and the greater world. The unit will specifically focus on creating and interpreting histograms and box plots while building upon the statistical concepts and skills they learned in the previous unit. They will create the data through engaging activities. Students will also build an appreciation for interpreting graphs by understanding the role graphs play in their daily lives.

A major consideration in teaching this unit is that students do not yet grasp the concepts of mean and median from the previous unit. This is an ethical concern because if we move forward too quickly the students who are already behind will fall even further behind. Another concern is that students will not grasp the original skills before the class moves onto additional skills. To remedy this concern, there will be two days provided for students to practice the skill before additional skills are added. To meet the needs of all learners, students will be grouped at table groups that optimize diverse learners. Through this organization, advanced learners will have the challenge of supporting and instructing struggling learners while struggling learners will have peer coaches.

### 1.3 What students will know and what they will do with this knowledge

Successful students will be able to create a histogram and box and whisker plot from data. They will also be able to summarize and interpret information gathered from numerical data. Finally, students will have a greater appreciation for how graphs are used to portray information in their daily lives.

### 1.4 Learning Targets

<b>Learning Targets</b>	<b>Type of Learning Targets</b>	<b>Common Core State Standard</b> (See appendix A for more details)
Students will understand how graphs can be used to portray information.	Concept	6.SP.4
Students will be able to make and interpret histograms and box and whisker plots.	Skill	6.SP.4
Students will be able to summarize information from a graph including identifying overall patterns and statistical variability.	Skill	6.SP.5c
Students will have a greater appreciation for how graphs can be used to portray information in society.	Disposition	6.SP.5

### 1.5 Connections between the Learning Targets and conceptual understanding, procedural fluency, mathematical reasoning and problem solving skills

Through learning the first and second learning targets, students will build a conceptual understanding of graphs and their usefulness. Students will be able to build upon this conceptual knowledge to develop procedural fluency with the assistance of manipulatives, exit ticket assessments and one-one teacher check-ins. This is necessary to fully master the second learning

target of making and interpreting histograms and box and whisker plots. Through successful completion of the third learning target, students will engage in mathematical reasoning and problem solving skills as they learn how data and graphs can be interpreted and summarized. Finally, the last learning target requires students to develop mathematical reasoning and problem solving skills that they can use outside of class to interpret graphs they see on a daily basis.

### **1.6 Essential question**

How do I create and understand graphs when would I ever use this?

## **2. LEARNERS**

### **2.1a Academic Development**

I am within the inclusion classroom. This means that the class is made up of students with varied math and emotional and behavioral abilities. The class is co-taught by one general education math teacher and one special education teacher who is also endorsed for math. About two-thirds of the students are competent at math while the other third is about one level below grade level. Four students have math IEP goals. The IEP math goals include the ability to solve problems with numbers, decimals, fractions and percent's; solve real-world problems with fractions; fluently and accurately multiple up to a three digit number; quickly recall division facts and solve math story problems. The students with math IEP goals receive additional support from the special education teacher in the form of additional visuals and shortened problems.

### **2.1b Academic Language Development**

There are five English Language Learners in the class and four students who have IEP goals for reading. Overall, the class's academic language is not aligned with the 6th grade Common Core standards and they have difficulties with language functions, syntax and vocabulary. If the vocabulary is too fast or presented before the understanding of the concept many students will be unable to comprehend the new information.

### **2.1c Social and Emotional Development**

The inclusion class includes three students with emotional, social and behavioral IEP goals. There is also an additional student who is receiving Tier 2 support and is being evaluated for emotional and behavioral special education services. Emotional, social and behavioral IEP goals of the students include the ability to use calm and appropriate words to express frustration; comply appropriately with requests and prompts from individuals in a position of authority; demonstration of verbal and physical self-control and follow direction from all staff. These students receive additional support in class through the special education teacher and with their special education case manager. Additionally, students self-assess the appropriateness of their actions from 1 to 5. If their score is higher than a 2.5, they receive incentives from their case manager at the end of the day.

### **2.1d Family/Community/Cultural Assets**

About half of the students in my class have strong family ties to the area including several students who are recent immigrants and have strong ties to their local cultural communities. Languages spoken at home by students include Spanish, Russian, Vietnamese, Mandarin, Somali and Amharic. About 80% of the students in my class receive reduced and free

lunch and a couple of them are couch surfing and homeless. Students come from multigenerational, two-parent, single parent and foster parent homes. Many families attended the school open house at the start of the year and demonstrated investment in their student's success. The PTSA is strong and thriving.

### **2.1e Disposition related to central focus**

Similar to the various levels of academic development, the class is diverse in their appreciation of math. Several students expressed joy around math while several others have expressed ambivalence and hatred. Many students are willing workers although it isn't clear they always fully understand many concepts. Other students lack confidence in their abilities, as is evidenced through their frequent questions and desire to work one-on-one on problems. Students have demonstrated a more positive disposition towards math when they have been able to relate the math to their lives and understand the answer to "why do we have to learn this." The hope is that through creating data and making graphs, the students will find the unit interesting and relevant to their lives.

### **2.2 Planning for all my students**

During this unit, we will be building upon the previous unit of statistics within a supportive and growth-mindset framework. Academic language and formulas will be clearly defined and displayed on posters around the room. The co-teachers will also present the information in multiple different ways through modeling, collaborative work and manipulatives. All class instruction will be brief. The remainder of class will be filled with engaging mathematical engagement with multiple opportunities for development of procedural fluency wit

the use of manipulatives. In order to focus on the larger concepts instead of basic arithmetic, calculators and computer simulation will be available the majority of the time. To specifically support the students with social, emotional and behavioral disabilities, there will be opportunities for movement, one on one check ins and short breaks from academic demands. Teachers will also give students with social, emotional and behavioral IEPs timely feedback.

As this class is comprised of a large range of abilities, teachers will do frequent check-ins with individual students and groups. Students will be strategically placed in diverse math ability groups so that they may positively learn from each other.

As a culturally responsive teacher, I will attempt to make the lessons interesting and relatable to my students. Students will also have an opportunity to choose a subject for their unit project that is taken directly from their classroom data. There will be no homework as homework is inequitable and can often create additional barriers for students and families who are stretched thin at home.

### **2.3 Family Involvement**

At Sylvester one of my co-operating teachers sends a parent letter home every unit in English and in Spanish. Below there are two versions of the parent letter, one in English and one in Spanish. At the school, they have the assistance of a Spanish speaking staff member to translate the letter. For this example, I used google translate but would certainly someone who speaks fluent Spanish to translate if I were sending it home. (See appendix B for worksheets and website print pages).



Sylvester Middle School  
16222 Sylvester Rd SW  
Burien, WA 98166

Dear Families and Caregivers,

Next week students will be starting a unit on graphing that will complement the previous unit they completed on statistics. We have planned a fun and engaging unit for students where they will learn how to make a histogram and a box and whisker plot while going outside and learning more about their classmates. This unit covers several Common Core State Standards for 6th grade and builds upon learning the students did in 5th grade math.

During this unit, students will work on graphing a statistical question about their classmates in multiple different ways. There will be plenty of time during class for students to work on this project. However, if students do not fully utilize class time, they may have this project as homework. This unit project is due on the 5th day of unit. The day after the graphs will be prominently displayed around the classroom. Students will then be responsible for summarizing data from their classmate's graphs.

It is our hope that by the end of the unit, students appreciate the role graphs play in their lives. Each day of the unit we will be reviewing, summarizing and analyzing the usefulness of these graphs. We expect students to bring in paper or digital graphs they have found from social media, newspapers, advertisements or other school subjects. Please help your student locate these graphs.

If you are interested in additional review for yourself or your student, we have attached a comprehensive worksheet and multiple links for online activities. You can also visit the class website at <https://graphingwithmscotton.wikispaces.com>.

Please contact us for any reason.

Sincerely,

Ms. Cotton and Ms. Brisco

[o-annie.cotton@highlineschools.org](mailto:o-annie.cotton@highlineschools.org) and [kiana.brisco@highlineschools.org](mailto:kiana.brisco@highlineschools.org)





Sylvester Middle School

16222 Sylvester Rd SW

Burien, WA 98166

Estimadas familias y cuidadores,

La próxima semana los estudiantes aprenderán cómo representar gráficamente. Los estudiantes se basarán en su aprendizaje a partir de quinto grado. Será divertido y atractivo! Se va a crear un gran proyecto durante la clase para demostrar lo mucho que han aprendido. El proyecto se debe a los cinco días. El día 6 van a analizar y resumir las gráficas de sus compañeros de clase.

Esperamos que para el final de la unidad, los estudiantes podrán apreciar el papel gráficas juegan en sus vidas. Esperamos que los estudiantes traen a la clase gráficas que encontraron en Internet, anuncios o en otras materias escolares. Por favor, ayudar a su estudiante para localizar estos gráficos.

Si usted está interesado en una revisión adicional para usted o su hijo, hemos adjuntado una hoja de cálculo integral y múltiples enlaces para actividades en línea. También puede visitar el sitio web de clase en <https://graphingwithmscotton.wikispaces.com>.

Por favor, póngase en contacto con nosotros por cualquier motivo.

Sinceramente,

Sra Cotton y la Sra Brisco

[o-annie.cotton@highlineschools.org](mailto:o-annie.cotton@highlineschools.org) [kiana.brisco@highlineschools.org](mailto:kiana.brisco@highlineschools.org)

### 3. EFFECTIVE TEACHERS PLAN FOR INSTRUCTION

#### Background

Prior to this unit, I will give the students a pre-assessment quiz to test their understanding of graphs. I will also evaluate their grasp of the mean, median and mode from the previous unit so I know to what extent we need to review these skills. I will cater the following lesson plans to meet the needs of the students.

#### 3.1i Title Day 1

Graphing Review and Misleading Graphs (one day, 56 minute period)

#### 3.1ii Learning Targets and Common Core, 3.1iii Evidence of Learning and 3.2 Assessments

Learning Target and Type	Common Core State Standard	Evidence of Learning	Assessment and Method Type
Students will know the basic components of graphs. (Fact)	6.SP.4	Students will correctly draw and identify graphs.	Students will draw the graph on their whiteboards. (Personal Communication) Informal Formative
Students will be able to identify misleading information on a graph. (Skill)	6.SP.4 and 6.SP.5	Students will identify how graphs are misleading and correct them.  * Appendix C	Students will each turn in a worksheet. (Short Answer Response) Formal Formative  * Appendix C

### 3.3i Lesson Narrative

When students enter, there will be a joke about graphs on the screen to gather student attention. Students will be welcomed and told that during the graphing unit we will build upon their previous investigation of mean, median and range and prior knowledge of bar graphs from the year before. I will stress that through the lessons and the unit project they will all become terrific statisticians learning how to make and interpret histogram and box and whisker plots as well as appreciate the many places they find graphs in daily life.

As a class we will review students' prior knowledge of bar graphs from 5th grade math by creating a comprehensive bar graph to answer the statistical question "what is your favorite fast-food out of Taco Bell, Pizza Hut or McDonalds?" Students will vote by raising their hands and I will write the data on the board. With their table groups students will "turn and talk" about the necessary components of a graph and then draw these on their whiteboards for a check for understanding. Students will then be chosen with popsicle sticks to add components to create a traditional bar graph on the board until it is complete. Students will then copy the diagram into their math notebooks. We will define the components and students will copy them into the math dictionary section of their notebooks.

After reviewing prior knowledge, I will put a graph I found from an advertisement on the screen. Students will be instructed to hypothesize the meaning of the graph in their notebooks, "turn and talk" with their table and then share out their ideas with the class. After modeling the activity, I will tell students that they are all responsible to bring in at least one example of a graph they have discovered in the media, advertisements, books or other class subjects. I will tell

students that we will be doing this activity at the beginning of every class in order to build their awareness and appreciation of graphs in everyday life.

I will pass out a worksheet to each student that features misleading graphs. As table groups, students will work together to argue how the graph is misleading and correct it. We will give limited direction to allow students room to problem solve and reason. These worksheets will be collected at the end of class.

In order to collect statistical data, there are twelve sheets of paper around the classroom, each one with a different statistical question. During the last ten minutes of class, students will tour the room and write their response to the questions.

How old are you in months?

How many siblings do you have?

How many books have you read in the last year?

How long does it take you to get ready for school?

How many letters do you have in your full name?

How tall are you in inches?

How many hours do you spend playing games in a week?

How many pets do you have?

How many hours did you sleep last night?

How long does it take you to get home from school?

How many movies do you watch in a month?

How often do you eat dessert in a week?

### 3.3ii Resources and Materials

24 write boards and markers

24 worksheets

Powerpoint

math notebooks

popsicle sticks

12 large paper sheets

doc camera

**3.3iii Co-teaching**

The teachers primarily follow the “one teach, one assist” model but switch roles depending on the day.

**3.1i Title Day 2 and Day 3**

Skee Ball and Histograms (two days, 56 minute class)

**3.1ii Learning Targets and Common Core, 3.1iii Evidence of Learning and 3.2 Assessments**

<b>Learning Targets and Type</b>	<b>Common Core State Standards</b>	<b>Evidence of Learning</b>	<b>Assessment and Method Type</b>
Students will know the definition of histogram. (Fact)	6.SP.4	Students will correctly label a histogram.	Through oral responses from students (Personal Communication)  Informal Formative
Students will be able to create histograms. (Skill)	6.SP.4	Students will create histograms that correctly display the skee ball data and their statistical question.  * Appendix D	Printing of their histograms. (Performance Assessment)  Formal Formative * Appendix D
Students will be able to interpret histograms. (Skill)	6.SP.4	Students will interpret histograms.  * Appendix E	Exit Ticket (Short Answer Response)  Formal Formative * Appendix E

**3.3i Lesson Narrative**

When students enter class, there will be a graph from an advertisement on the screen that one of the students brought in. Students will be instructed to hypothesize the meaning of the graph in their notebooks, “turn and talk” with their table and share out their ideas with the class.

Playing skee ball will allow students to be actively engaged while creating data sets, plot lines and histograms as a group, a class and individually. I will model responsible ways to use a skee ball board for the students and demonstrate the six options for available scores and how to record them on a T-chart and line plot. The six options include the five holes, 1 - 5 from the bottom to top and 0 for a missed shot.

We will then go outside where students will work in groups of four comprised of differing math abilities. Students will take turns shooting five ball bearings on the skee ball board. After each shot, they will record the shot in their notebooks with a T-Chart and a line plot. The left column will be the score and the right column will track with the shots with Xs. At the end of the activity each student should have 20 Xs in the right column of their T-chart known as data points.

While the students are creating their data, I will place paper plates on the ground in a line representing the 6 intervals students could have scored as their median. When students are finished with the skee ball activity, they will be instructed to line up behind the paper plate of their median number. Students will be asked to identify the range, modes and median of the class data and portray this information with their fingers.

Building upon what we learned the day before about graphs, I will tell students that they are modeling a histogram. Inside, students will take notes as I draw the histogram on the board.

With input from students we will build a T chart comparing and contrasting the difference between a bar graph and a histogram. I will ask them probing questions and look for answers with popsicle sticks. Students will also copy the vocabulary into the math dictionary section of their notebooks.

Similar to the day before, when students enter class for the second day of the lesson plan, there will be a graph from an advertisement on the screen that one of the students brought in. Students will be instructed to hypothesize the meaning of the graph in their notebooks, “turn and talk” with their table and share out their ideas with the class.

I will then briefly tell students about the unit project and distribute the assessment rating scale which states clear expectations of the project components (Appendix F). After selecting a statistical question from the ones collected in class, students will create a histogram and box and whisker plot in addition to finding the mean, median, range and mode. Students will be given time and resources to work on the project during class. The project will be due on day 5 of the lesson. On day 6, students will complete the second part of the lesson where they summarize other graphs in their own words and answer the attached three questions (Appendix F).

For the majority of class, students will practice mathematical proficiency by utilizing computers to create and interpret histograms. They will start by going to the National Library of Virtual Manipulatives to build histograms. Students will be given a couple minutes to explore the manipulative and then will be instructed to construct a histogram from their group’s skee ball data. They will then create a histogram depicting their unit project. Both of these will be turned

in at the end of class. Secondly, students will log onto IXL to practice interpreting histograms. At the end of the class they will complete one question interpreting histograms on an exit ticket.

### 3.3ii Resources and Materials

Thirty ball bearings (five for six groups)

Six skee ball boards (one per group)

One computer per student

[http://nlvm.usu.edu/en/nav/category\\_g\\_3\\_t\\_5.html](http://nlvm.usu.edu/en/nav/category_g_3_t_5.html) - Histogram

<https://www.ixl.com/math/grade-6/interpret-histograms> -Interpret Histogram

math notebook

6 paper plates, popsicle sticks

24 Exit Ticket slips

### 3.3iii Co-teaching

The teachers primarily follow the “one teach, one assist” model but switch roles depending on the day.

### 3.1i Title Day 4 and Day 5

Shoe Size with Box and Whisker Plots (two days, 56 period class)

### 3.1ii Learning Targets and Common Core, 3.1iii Evidence of Learning and 3.2 Assessments

Learning Targets and Type	Common Core State Standards	Evidence of Learning	Assessment and Method Type
Students will know the definition of a box and whisker plot. (Fact)	6.SP.4	Students will correctly label a box and whisker plot.	Through oral responses from students (Personal Communication) Informal Formative



Students will be able to create box and whisker plots. (Skill)	6.SP.4	Students will create box and whisker plots that correctly display shoe size and their statistical question. * Appendix D	Printing of their box and whisker plots. (Performance Assessment) Formal Formative * Appendix D
Students will be able to interpret box and whisker plots. (Skill)	6.SP.4	Students will interpret box and whisker plots. * Appendix E	Exit Ticket (Short Answer Response) Formal Formative * Appendix E
Students will be able to draw conclusions about a set of data. (Skill)	6.SP.4 and 6.SP.5	Students will analyze data, create graphs and draw valid conclusions from a statistical question. * Appendix D	Unit Projects (Performance Assessment) Formal Summative * Appendix D

### 3.3i Lesson Narrative

When students enter class, there will be a graph from an advertisement on the screen that one of the students brought in. Students will be instructed to hypothesize the meaning of the graph in their notebooks, “turn and talk” with their table and share out their ideas with the class.

I will start this activity through a model of a box and whisker plot using the shoe size of students. With the assistance of the students, I will collect the data (shoe size) and represent it through putting the shoe sizes in order from smallest to largest on the board. Utilizing skills learned through past activities, the class will calculate the median of the data and range of the data in table teams. After calculating the median, the class will be instructed to find the median of the two halves on either side of the median. For both calculations, they will do the math

individually in their notebooks and then share out. I will plot these numbers on a number line and construct the box and whiskers plot while explaining the meaning behind each of the components. We will then talk through the vocabulary. Students will copy the model and definitions down in their notebooks.

After completing the box and whisker plot of the classes shoe sizes, students will be told that LeBron James with a size 16 shoe has joined the class. They will be instructed to independently write down their hypotheses of how this additional classmate will change their box and whisker plots. They will then share out their hypothesis and evidence in a “turn and talk” and then as an entire class. We will alter the box and whisker plot to accommodate the new data. For the last ten minutes of class, I will model the expectations for the unit project and field any questions.

When students enter class for the second day of the lesson, there will be a graph from an advertisement on the screen that one of the students brought in. Students will be instructed to hypothesize the meaning of the graph in their notebooks, “turn and talk” with their table and share out their ideas with the class.

Students will then work in groups of two to calculate the mode, median, mean and range and create their own box and whisker plots using shoe size data of NBA or WNBA players. They will then log onto the computers to create and interpret box and whisker plots. First, they will use the National Library of Virtual Manipulatives to digitally compute the box and whisker plot. They will also create and print a box and whisker plot for their unit project data. Secondly, they will log onto IXL to interpret box and whisker plots.

While students work independently, the co-teacher and I will check-in with all the students around their unit project. We will be looking for the correct mathematical equations, display of data on the histogram and box and whisker plot and clear questions that students can answer by evaluating the graphs. We will have students make necessary corrections before their projects are shared the following day. They will answer one question interpreting a box and whisker plot as an exit ticket.

### 3.3ii Resources and Materials

One computer per student

<https://www.ixl.com/math/grade-6/interpret-box-and-whisker-plots> - Interpreting Box and Whisker Plots

[http://nlvm.usu.edu/en/nav/category\\_g\\_3\\_t\\_5.html](http://nlvm.usu.edu/en/nav/category_g_3_t_5.html) - Creating Box and Whisker Plots

Each student has a math notebook

popsicle sticks

24 exit tickets

Calculators

Exemplar Unit Project

Doc Camera

### 3.1i Title Day 6

Unit Project Summarization and Assessment (one days 56 minute period)

### 3.1ii Learning Targets, Common Core, 3.1iii Evidence of Learning and 3.2 Assessments

Learning Target and Type	Common Core State Standard	Evidence of Learning	Assessment and Method Type
Students will be able to extract information from a graph to answer questions. (Skill)	6.SP.5c	Students will answer questions based on data represented in graphs.  * Appendix D	Through a short answer response (Short Answer)  Formal Summative  * Appendix F

Students will be able to summarize the information from a graph including identifying the overall patterns. (Skill)	6.SP.4	Students will summarize information from a graph including identifying overall patterns and statistical variability.  * Appendix D	Through a short answer response (Short answer)  Formal Summative  * Appendix F
Students will have a greater appreciation for how graphs can be used to portray information in society. (Disposition)	6.SP.4	Students will complete a self-assessment.  * Appendix H	Through short answer response on self-assessment (Short Answer)  Formal Summative  * Appendix H
Students will understand how graphs can be used to portray information. (Concept)	6.SP.4	Students will collect graphs from daily life and summarize the data.	Through notes in their math notebooks (Short Answer)  Informal Summative

### 3.3i Lesson Narrative

When students arrive, they will see that their unit graphs are prominently hung up around the room. There will be a graph from an advertisement on the screen that one of the students brought in. Students will be instructed to hypothesize the meaning of the graph in their notebooks, “turn and talk” with their table and share out their ideas with the class.

I will hand students rubrics, outlining the expectations for a complete summarization and show them an example of what I expect on the doc camera. Students will be then be given two different student graphs and asked to summarize the graph and answer the three adjoining

questions. They will be given the majority of the class to complete this summative assessment. During the last 10 minutes of class they will be given self-assessments of their learning and participation in the graphing unit.

### **3.3ii Resource and Materials**

Math notebooks	Self- Assessment Rubric
Calculator	Student Response Sheet with 2 graph copies and questions
Doc camera	

## **4. EFFECTIVE TEACHERS ANALYZE AND REFLECT**

### **4.1 Connections to Theory and Research**

This unit is strategically laid out to allow students plenty of time for review, modeling, processing as a group and individual practice. It loosely follows the direct instruction model as each new skill will be introduced with engaging data and modeled through guided practice and "turn and talks." Burns states that modeling problems and instituting "turn and talks" allows students opportunities to process the information and receive feedback about their ideas before sharing out to the entire group (2007).

Topics and data sets have been specifically chosen to build affective engagement, or enthusiasm and interest around creating graphs as they reflect the interests and identities of the students (Parsons, et.al. 2014). Collaborative activities also encourages positive student engagement and an increased development of conceptual understanding. I will stress that this is a place of learning and that students will not be penalized for not knowing answers. Fostering a

supportive and open environment where students are not penalized for mistakes also increases student learning and engagement (Parsons, et.al, 2014).

Building upon Marzano's high yield strategies, students will use nonlinguistic representations such as T-charts, models and graphs to represent their data (McREL). They will engage in kinesthetic activities such as creating a human histogram to assimilate knowledge and use computer manipulatives to learn the concept even if they struggle with the mathematical skill.

Since the class is comprised of many high needs learners, I strategically designed this unit to go at a slower pace with two days dedicated to each new skill to allow students time for guided practice, engagement with the material and practice of skills old and new. During the work days, students have opportunities to check in with teachers as they use computer manipulatives. By allowing time for students to move at their own pace and practice the new skills while strengthening the old skills, I am helping the students build procedural fluency to solve contextual and mathematical problems (National Council of Teachers of Mathematics, 2014).

#### **4.2 Academic Language**

My class is made up of several students who are behind grade level and who have ELL and SPED supports. I will support these students is building upon their previous knowledge by referencing contexts and data that they are familiar with such as sports and their classmate community. Burns states that vocabulary should not be introduced until after students are familiar with the mathematical concepts (2007). For this reason, I will be teaching the new

mathematical concepts and skills using vocabulary that students are familiar with and following the teaching up with clear descriptions and examples of the new vocabulary. When new vocabulary is introduced, students are expected to keep a list of the vocabulary in the mathematical dictionary part of their notebook. Writing vocabulary by hand reinforces the meaning (Burns, 2007). It can also function as a reference as they go forward.

In addition to strategically introducing new vocabulary, I will model the use of mathematical language as I discuss and interpret the daily examples of graphs at every start of class. Students will be given ample opportunities to practice and utilize mathematical language as they interpret the daily graph examples, “turn and talk” with classmates, discuss new concepts as a class and complete the second part of their unit projects. In order to create an environment where students are challenged to practice mathematical language verbally, I will also use popsicle sticks to call on students that may not readily volunteer to keep everyone on their toes.

### **4.3 Special Needs**

There are four students with IEP math goals that include solving math problems, four students have IEP reading goals, three students who have IEP social, emotional and behavioral goals and five students are English Language Learners. In order to support the special needs of these students in addition to supporting all students overall, I will provide them with sentence starters, list out mathematical steps, provide visuals and differentiate assessments. We will go at a slower pace and dedicate ample time for procedural fluency. Students will also be strategically placed with students of varied abilities. This will provide an opportunity for the advanced

students to coach the struggling students. It will also provide the struggling students with additional resources and support. Students with social, emotional and behavioral goals will be provided with timely feedback and academic breaks. Most importantly, we will be familiar with student's strengths and goals and change strategies to accommodate all students while utilizing a supportive and encouraging growth-mindset classroom.

## 5. EFFECTIVE TEACHERS EDIT

### 5.4 Annotated Bibliography

Burns, M. (2007). *About teaching mathematics: A K-8 resource* (3<sup>rd</sup> ed.). Sausalito, CA: Math Solutions Publications.

- This book is an excellent resource for math teachers complete with problem examples and best practices.

Chong, L.C, Kuen, L.M, Cheng, L.W (2013). *Math in Focus: Singapore Math*. Boston, MA :Houghton Mifflin Harcourt

- I based my lesson plans and vocabulary on this student math book.

IXL Learner. (2016, October 11). IXL Learner. Retrieved from <https://www.ixl.com/>

- This website asks a series of questions for students to answer specifically pertaining to histograms and box and whisker plots. I also created my exit tickets and parent worksheet from questions I found on this website.

Lillie, Jonathan. (2016, October 11). Common Standards Math. Retrieved from [http://ccssmath.org/?page\\_id=584](http://ccssmath.org/?page_id=584)



- This website was extremely helpful as I built my lesson plans and looked for examples.

Mid-continent Research for Education and Learning (McREL). (2016, October 11). Marzano's 9

Strategies for Effective Teacher. Retrieved from

[http://www.kellyphilbeck.com/uploads/7/4/4/8/7448814/marzano\\_9\\_strategies\\_for\\_effective\\_teaching.pdf](http://www.kellyphilbeck.com/uploads/7/4/4/8/7448814/marzano_9_strategies_for_effective_teaching.pdf)

- This PDF outlines strategies for effective teachers as identified by Marzano. I used the resource to inform my lesson plans.

National Council of Teachers of Mathematics (NCTM). (2014). Principles to actions: Ensuring mathematical success for all. Reston, VA: NCTM.

- This resource outlines strategies for effective teachers as identified by the NCTM. I used the resource to inform my lesson plans.

National Library of Virtual Manipulatives. (2016, October 11). Utah State University. Retrieved from [http://nlvm.usu.edu/en/nav/category\\_g\\_3\\_t\\_5.html](http://nlvm.usu.edu/en/nav/category_g_3_t_5.html)

- This website has numerous manipulative you can use to generate graphs including histograms and box and whisker plots.

Parsons, S., Nuland, L., & Parsons, A. (2014). The ABCs of student engagement. *The Phi Delta Kappan*, 95(8), 23-27. Retrieved from

<http://www.jstor.org.proxy.seattleu.edu/stable/24374604>

- This article identifies engagement as being affective, behavioral and cognitive engagement.

## **6. EFFECTIVE TEACHERS USE FEEDBACK**

### **6.1 Effective Teachers**

Through my coursework thus far, I have been challenged to think about what kind of teacher I want to be. Thus far, I have had great role models from our readings by Delpit and at my internship placements of warm demanders. These are teachers who create structured classrooms where there are clear expectations and structure as well as unending compassion and opportunities for success and do-overs. Observations in my field placement have only solidified what I have learned at Seattle University about the importance of modeling and allowing students time to think and process. It is very important for me to have teacher models and independent journaling followed by “turn and talks” and class share outs within the lesson plans. Students of all types need to see models of exemplar assignments and appropriate behavior, including graduate students.

**Appendix A**

6.SP.4 – Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.5– Summarize numerical data sets in relation to their context, such as by:

6.SP.5.c – Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.